logical conditions at selected stations and the quality of a single crop. It shows at once that in certain sections sugar beets can not be successfully raised, not because they will not grow, but because the percentage of sugar content is too small. It also shows that apparently high temperature is responsible for the inferior quality of the beet at southern experiment stations.

No doubt similar investigations would disclose equally interesting relations between meteorological conditions and other crops; and in these relations, not alone the farmer, but the whole country is deeply interested.

The investigation of the chemical composition of crops must of course be conducted by the Bureau of Chemistry, but the Weather Bureau, through its corps of more than 3,000 meteorological observers, is able to supply climatic data not otherwise available, and it takes pleasure in cooperating with other bureaus in the promotion of these important investigations.

The Climate and Crop Division of the Weather Bureau is conducting a most important investigation into the relations between the meteorological and the general crop conditions, especially the yield per acre. The crop bulletins, issued weekly during the season of vegetation, summarize for each State the general effect of the weather upon the crops. Any one who is interested in the subject can easily trace, week by week, the effect of abnormal heat, unseasonable cold, excessive rains, or drought upon the various crops. The Bureau of Chemistry is investigating questions that these reports can not touch upon, i. e., the relation between the chemical composition of the crops and these meteorological conditions.

These facts help to emphasize the intimate relations that exist between the work of the various scientific bureaus of the Department of Agriculture. In fact, just such amicable relations should exist between the work of the various scientific bureaus and societies of the whole country. Each can and must draw from and contribute to the work of others; for no science is complete in itself. From mutual cooperation will come mutual advancement.

The importance of the work of our voluntary observers is also clearly shown. The number of fully equipped stations with a paid corps of observers is necessarily limited. Furthermore, most of the first class stations must be located in large cities near the centers of population, where the meteorological conditions differ materially from those that prevail in the agricultural districts. Our voluntary observers are, as a rule, located in the midst of crop producing districts, and they are therefore able to supply just the data required for the study of the relation of the crop to the meteorological conditions. Too much emphasis can not be placed upon the importance of the data they are furnishing, and also upon the necessity for accuracy and faithfulness on the part of the observers who make and record the observations.—*H. H. K.*

THE METEOROLOGICAL SOCIETY OF MAURITIUS.

In a paper read before the Meteorological Society of Mauritius on April 11, 1901, Mr. T. F. Claxton, F. R. A. S., reviewed very briefly the results achieved during the fifty years of its existence. He stated that the society was established on the first day of August, 1851, its primary object being the promotion of meteorological science in general, and especially that branch of it called cyclonology or the laws of storms.

To this end the society undertook the following work:

1. To procure instruments of the best description as standards of comparison, and to endeavor to keep a supply of other instruments at moderate prices for the use of persons in the colony and its dependencies, and of commanders and masters of vessels.
2. To provide for meteorological, magnetical, and tidal observations being made in Mauritius and its dependencies, Rodrigues, Seychelles, Diego Garcia, etc., and to aim at the establishment of a permanent meteorological and magnetical observatory.
3. To tabulate meteorological observations taken daily on board vessels in the Indian Ocean.
4. To collect or procure extracts from any meteorological records existing in the archives of the colony, or in hands of private individuals.
5. To encourage masters of vessels trading to this island to make and record observations on the state of the weather, tides, and currents as experienced in the course of their respective voyages, and to communicate such observations to the society.
6. To correspond and exchange observations with similar societies in other countries.
7. To collate, arrange, and publish the information that may be obtained from the above sources.

Probably the most important work of the society has been in connection with the establishment and maintenance of the Royal Alfred Observatory at Mauritius, the comparison of ships' barometers and chronometers with the standards of this observatory, and the collection and discussion of meteorological data from the log books of vessels and from other sources. Barometer comparisons are effected by means of one or two readings of the ship's barometer that are made by a clerk from the observatory. It would seem that much better comparisons would be obtained if the ship's captain were induced to make daily readings while in port, as is done by our own Hydrographic Office. Not only would a greater number of readings be obtained for comparison, but the personal error of the captain's readings and the chance of introducing new errors would also be eliminated.

The decreased number of vessels now stopping at Mauritius as compared with former years, and also the change from the slow sailing to the faster steam vessels, has seriously diminished the number of observations that can be obtained from ships' log books. To offset this loss special efforts are now being made to establish permanent stations on the various small islands in the Indian Ocean.

It is to be hoped that this may be accomplished, since it will be a source of regret to meteorologists if the valuable studies of cyclones in the Indian Ocean, which have been conducted by the society in years past, should now be curtailed through lack of meteorological data.

Mr. Claxton refers with justifiable pride to the publications of the society. Among these he makes special mention of the daily synoptic weather charts of the Indian Ocean. These commenced with January, 1861, and were published under the direction of Dr. C. Meldrum in 1881. Of late years, owing to the few reports received from vessels, the charts have been published during the hurricane season only.

The Cyclone Tracks published in 1891 is another valuable work, and especially the annual reports of the Royal Alfred Observatory which go far toward filling what would otherwise be a large gap in our meteorological observations in the southern hemisphere. A meteorological atlas of the south Indian Ocean is in preparation.

We heartily congratulate the Meteorological Society of Mauritius upon the results achieved during its half century of work. The members are imbued with the true spirit of investigation, and we look for even better results in the future.

Can not nephoscope observations be made and discussed at the Royal Alfred Observatory?—*H. H. K.*

EARLY METEOROLOGICAL RECORDS.

In the Climate and Crop Report for November, Dr. O. L. Fassig has begun the reprint of some notes by Rev. John Campanius on the weather near Wilmington, Del., during 1644 and 1645. We can but believe that similar ancient records for other parts of the country can be discovered by diligent research. For instance, it was quite the custom for southern planters to keep a daily record of the weather in

connection with the work on the plantation. Although many such manuscripts have long since been destroyed, yet it is quite worth while to continue the search for such as remain, and we shall always be glad to print them in full or in abstract in the MONTHLY WEATHER REVIEW.—*C. A.*

LUNAR HALO AND LUNAR CORONA.

The following is an extract from a letter from Prof. John W. Harshberger, Philadelphia, Pa., dated December 22, 1901:

This evening, about 6 o'clock, I observed such a remarkable lunar halo and cloud formation that I thought a record might be of scientific interest.

The moon was about half way up to the zenith and was surrounded by an inner and an outer halo ring. The moon shone through a compact grayish-white cloud. Suddenly to the south of the moon a deep rift or crack appeared in the cloud, which reminded me of a huge ice crack made from bank to bank of a wide river. The clouds at once began to drift northward and the moon soon shone brightly through the sharply defined rift, which was just wide enough to accommodate the full diameter of the moon. At the same time the halo commenced to fade away and in twenty minutes had disappeared, but the clouds still resembled floe ice, the drift being toward east-northeast.

The small circles around the moon are diffraction circles and differ in origin from the large circles or halos. The former depend on the size and distance apart of the cloud particles, and a slight change in the texture of the cloud may make them disappear, while the large halos of 22° and 45° radius are more enduring. The small circles may originate in fog or haze that is quite near the observer; the larger halos generally belong to the clouds proper and have some local value as indicative of conditions that form approaching rain.—*C. A.*

WEATHER BUREAU MEN AS INSTRUCTORS.

Mr. T. B. Jennings, Section Director, Topeka, Kans., reports that on the 3d he addressed the older scholars of the Jackson School of that city on "The Weather Bureau and its instruments," and the teachers of the same school on "The Weather Bureau and its work." On the 4th he addressed the high school teachers and scholars, combining the above subjects into one lecture.

The Weather Bureau office at Macon, Ga., was visited on the 6th by the physical science class of the Bibb County Normal School, and the work of the office was explained by Mr. John R. Weeks, Observer in Charge, in an informal lecture.

The following is from the Sioux City, Iowa, Journal of December 10, 1901:

Last evening Mr. U. G. Purssell, in charge of the Sioux City office of the United States Weather Bureau, delivered the first number in a lecture course which has been inaugurated under the auspices of the South Sioux City High School and the management of Mr. C. P. Bowman, Superintendent of the Schools of that place.

Mr. Purssell devoted his remarks to the history of the Weather Bureau, its methods of work, and the benefit it has been to the people of the country. After speaking of the growth of the Bureau and the increasing influence of the service, Mr. Purssell entered into a description of weather stations about the country. He spoke of the equipments of these stations and the instruments used. He referred also to the Bureau's telegraphic system, the distribution of warnings and reports to the different interests affected by the weather. He told of the construction and the use of the weather maps, and spoke of the value of meteorological records and climatic data. He also made suggestions for the study of meteorology in the schools.

The lecture was heard by a good audience, which showed much interest.

Mr. J. J. Kelliher, Observer, United States Weather Bureau, Pocatello, Idaho, reports that on the 18th the class in physical geography in the High School of that city visited the Weather Bureau office, and that he exhibited and explained the various meteorological instruments in use.

We quote the following from the Minneapolis, Minn., Journal of November 10, 1901:

Weather maps for schools.—Observer Outram, of the Weather Bureau, receives many calls from the schools in the Northwest and in Minneapolis for sets of weather maps covering several consecutive days. The charts are very helpful in the study of the physics of the atmosphere, since they enable the instructor to point out the movements of the high and low areas, the areas of precipitation, and other interesting meteorological phenomena.

Mr. S. S. Bassler submits the following outline of a course in meteorology which he is to give at the University of Cincinnati, commencing with the second term of the current collegiate year:

A COURSE IN ELEMENTARY AND PRACTICAL METEOROLOGY.

Object of course.—The course is intended to give a knowledge of the leading facts concerning the atmosphere and its phenomena, and to enable the student intelligently to interpret a weather map and make a forecast therefrom.

Outline of the course.—Short talks, in connection with the text-book, on the subjects temperature, pressure, wind, moisture, cyclones and anticyclones, weather and weather maps, proverbs, and forecasting will be given in the order named. Laboratory work in connection with these subjects, singly and in combination, will establish the correlation between them and between general and local weather conditions. The course as outlined in detail largely contemplates self instruction, more especially in the practical part, through observation and reasoning.

Text-book.—Waldo's Elementary Meteorology.

Reference book.—Davis's Meteorology.

Time.—One hour (or more) each alternate Saturday afternoon during the second and third terms, with supplementary hours of study, observation, and practise in the use of instruments and the construction of weather maps.

Work.—Careful study of the text-book as a basis, concise written explanation of problems in the current lesson, essay writing and practise work as prescribed. Base maps and data for map practise will be furnished.

Equipment.—The text-book, the reference book (optional), a note book, blank base maps of the United States, lead pencils, and a red and blue pencil.

Note.—Should the class not be too large, this instruction will be given in the private office of the local forecast official, with whom arrangements may be made.—*H. H. K.*

HALO OF HEVELIUS.

Rev. Frederick Odenbach, S. J., Professor of Physics in St. Ignatius College, Cleveland, Ohio, sends us the following account of his observations of the halo of Hevelius, on December 6, 1901. This was first published in the Cleveland Plain Dealer, December 7, 1901, but numerous corrections have since been made by Father Odenbach.

Preceding a period of low barometric pressure, halos are often noticed about the sun. The commonest of these appear at a distance of 22° from the sun; an outer halo, at a distance of 46°, is also occasionally noted; but the great halo of Hevelius, at a distance of 90°, is a great rarity. At times when these halos are visible, there is also visible a parhelic circle passing through the sun and intersecting the halos. At the points of intersection of the parhelic circle with the halos are formed balls of light, which are known as "mock suns," "dog suns," or "sun dogs." These mock suns are really not reflections of the sun at all, but are merely intensified points of light at the intersections of two light circles. They are scientifically known as parhelia. Tangent to the halos are also occasionally noted tangent circles of equal radius. These are known as contact circles.

Yesterday the inner circle of 22° was complete, portions of the 46-degree circle were distinct, and the great circle of Hevelius was distinct